IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appellant	: Hiroyuki KOBAYASHI	Confirmation No.: 7753
Appl. No.	: 10/759,209	Examiner: P.R. Smith
Filed	: January 20, 2004	Group Art Unit: 3739
For	: LIGHT-EMITTING DIAGNOSIS SUPPORT DEVICE	

APPEAL BRIEF UNDER 37 C.F.R. §41.37

Commissioner for Patents
U.S. Patent and Trademark Office
Customer Service Window, Mail Stop Appeal Brief - Patents
Randolph Building
401 Dulany Street
Alexandria, VA 22314

Sir:

This appeal is from the rejection of claims 1 and 3-5, as set forth in the Final Office Action of October 24, 2006.

A Notice of Appeal and a Request for (one-month) Extension of Time were filed on February 26, 2007 in response to the Final Office Action of October 24, 2006, and the two-month period for filing an Appeal Brief was set to expire on April 26, 2007. The requisite fee for filing an Appeal Brief under 37 C.F.R. §41.20(b)(2) is submitted herewith.

However, if for any reason the necessary fee is not associated with this file or the attached fee is inadequate, the Commissioner is authorized to charge the fee for the Appeal Brief and any necessary extension of time fees to Deposit Account No. 19-0089.

(1) REAL PARTY IN INTEREST

The real party in interest is PENTAX Corporation, as established by an assignment recorded in the U.S. Patent and Trademark Office on January 20, 2004, at Reel 014906 and Frame 0851.

(2) RELATED APPEALS AND INTERFERENCES

No related appeals and/or interferences are pending.

(3) STATUS OF THE CLAIMS

Claims 1 and 3-5, all of the claims pending in this application, stand finally rejected and are the subject of this appeal. Appellant appeals the final rejection of claims 1 and 3-5. A copy of claims 1 and 3-5 is attached as an Appendix to this brief.

Claim 2 (Cancelled)

(4) STATUS OF THE AMENDMENTS

No amendments to the claims were filed under 37 C.F.R. § 1.116 after the final rejection of the claims of October 24, 2006.

(5) SUMMARY OF THE CLAIMED SUBJECT MATTER

Initially, Appellant notes that the following descriptions are made with respect to the independent claim and include references to particular parts of the specification. As such, the following are merely exemplary and are not a surrender of other aspects of the present invention that are also enabled by the present specification as well as those that are directed to equivalent structures

or methods.

Independent claim 1 recites a diagnosis supporting device connected to an endoscope system that captures an image of a subject facing a tip of an endoscope to generate special observation image data for displaying a special observation image for diagnosis based on image data transmitted from the endoscope system, said diagnosis supporting device comprising: a light emitting section that alternately emits excitation light to excite living tissue and reference light to illuminate the subject, said light emitting section including a light source that varies intensity of the excitation light and reference light in response to voltage applied to said light source; a probe that is inserted through a forceps channel to guide the excitation light and the reference light from a proximal end to a distal end; an image data acquiring section that acquires fluorescent image data generated by the endoscope system when the light emitting section emits the excitation light and acquires reference image data generated by the endoscope system when the light emitting section emits the reference light; an intensity measuring section that extracts the maximum brightness level from the brightness levels of all the pixels in the fluorescent image data and extracts the maximum brightness level from the brightness levels of all the pixels in the reference image data whenever the image data acquiring section acquires a set of the reference image data and the fluorescent image data; a calculating section that calculates a first intensity coefficient based on the maximum brightness level of the fluorescent image data according to a first operational expression and that calculates a second intensity coefficient corresponding to the maximum brightness level of the reference image data according to a second operational expression; and a light controller that controls the intensity of the excitation light according to the first intensity coefficient and that controls the intensity of the reference light according to the second intensity coefficient, said light controller controlling the

intensities of said excitation light and said reference light without a variable diaphragm and without a light stop by changing the voltage applied to said light source, wherein said first and second operational expressions are determined such that the intensities of said excitation light and said reference light increase as the maximum brightness levels of said fluorescent image data and said reference image data decrease.

In this regard, exemplary embodiments of the present specification are shown in FIGS. 1 to 6B, and disclosed at page 8, line 13 to page 30, line 10. The exemplary embodiments disclose a diagnosis supporting device (3) connected to an endoscope system (2) that captures an image of a subject facing a tip of an endoscope (1) to generate special observation image data for displaying a special observation image for diagnosis based on image data transmitted from the endoscope system (2), said diagnosis supporting device (3) comprising: a light emitting section (34) that alternately emits (Fig. 3; p. 14, line 4 to p. 15, line 22; p. 17, lines 4-9) excitation light to excite living tissue and reference light to illuminate the subject, said light emitting section (34) including a light source (34a) that varies (p. 15, line 23 to page 16, line 7) intensity of the excitation light and reference light in response to voltage applied (p. 15, lines 23-24) to said light source (34a); a probe (31) that is inserted (p. 13, lines 1-4) through a forceps channel (13) to guide (p. 17, lines 4-9) the excitation light and the reference light from a proximal end to a distal end; an image data acquiring section (35) that acquires (p. 18, line 18 to page 19, line 11) fluorescent image data generated (p. 19, lines 1-5) by the endoscope system (2) when the light emitting section (34) emits (p. 18, lines 21-23) the excitation light and acquires (p. 18, line 18 to page 19, line 11) reference image data generated (p. 19, lines 1-5) by the endoscope system (2) when the light emitting section (34) emits (p. 18, lines 21-23) the reference light; an intensity measuring section (354; p. 25, lines 1-3) that extracts (p. 21, lines 20-22)

the maximum brightness level from the brightness levels of all the pixels in the fluorescent image data and extracts (p. 22, lines 6-9) the maximum brightness level from the brightness levels of all the pixels in the reference image data whenever the image data acquiring section (35) acquires (p. 18, line 18 to p. 19, line 11) a set of the reference image data and the fluorescent image data; a calculating section (354; p. 25, lines 3-6) that calculates (p. 23, line 24 to p. 24, line 3) a first intensity coefficient (y_1) based on the maximum brightness level (S) of the fluorescent image data according to a first operational expression (p. 24, line 3) and that calculates (p. 24, lines 7-11) a second intensity coefficient (y_2) corresponding to the maximum brightness level (T) of the reference image data according to a second operational expression (p. 24, line 11); and a light controller (32, 34c, 354; p. 25, lines 6-9) that controls (p. 13, line 20 to p. 14, line 14; p. 15, line 23 to p. 16, line 7; p. 24, lines 15-17) the intensity of the excitation light according to the first intensity coefficient (y_1) and that controls (p. 13, line 20 to p. 14, line 14; p. 15, line 23 to p. 16, line 7; p. 24, lines 15-17) the intensity of the reference light according to the second intensity coefficient (y_2), said light controller (32, 34c, 354) controlling (p. 15, line 23 to page 16, line 7) the intensities of said excitation light and said reference light without a variable diaphragm and without a light stop by changing (p. 15, line 23 to p. 16, line 7) the voltage applied (p. 15, lines 23-24) to said light source (34a), wherein said first and second operational expressions (p. 24, line 3; p. 24, line 11) are determined (p. 23, line 24 to p. 24, line 14) such that the intensities of said excitation light and said reference light increase as the maximum brightness levels of said fluorescent image data and said reference image data decrease.

(6) GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

(A) The Rejection of Claims 1 and 3-5 under 35 U.S.C. §103(a) as being unpatentable over FURUSAWA (U.S. Patent No. 6,371,908) in view of OZAWA (U.S. Patent No. 6,080,104) and in further view of HIGUCHI (U.S. Patent No. 6,734,894). Although the statement of the rejection in paragraph [03] on page 2 of the Final Office Action only includes claims 1 and 3, it is clear from the explanation of the rejection in paragraphs [12] and [13] that the Examiner intended to include claims 4 and 5 in the rejection.

(7) ARGUMENT

The Decision to Reject Claims 1 and 3-5 under 35 U.S.C. §103(a) over FURUSAWA in view of OZAWA and in further view of HIGUCHI is Improper, and the Decision to Reject Claims 1 and 3-5 on this Ground Should be Reversed.

(1) <u>Claim 1</u>

There is no proper motivation to modify the teachings of FURUSAWA with the teachings of OZAWA, let alone to then modify the combined teachings of FURUSAWA and OZAWA with the teachings of HIGUCHI. Further, as set forth below, even the modification of FURUSAWA with the teachings of OZAWA, and the modification of the combined teachings of FURUSAWA and OZAWA with the teachings of HIGUCHI, would not result in the combination of features recited in claim 1.

FURUSAWA does not disclose a "calculating section that calculates a first intensity coefficient based on the maximum brightness level of the fluorescent image data according to a first operational expression" (see Final Office Action, page 4, paragraph [05a]) or a "calculating section... that calculates a second intensity coefficient corresponding to the maximum brightness level of the reference image data according to a second operational expression" (see Final Office Action, page 4,

paragraph [05b]). FURUSAWA also does not disclose an "intensity measuring section that extracts the maximum brightness level from the brightness levels of all the pixels in the fluorescent image data and extracts the maximum brightness level from the brightness levels of all the pixels in the reference image data whenever the image signal acquiring section acquires a set of the reference image data and the fluorescent image data" (see Final Office Action, page 4, paragraph [05c]). FURUSAWA also does not disclose that the "first and second operational expressions are determined such that the intensities of said excitation light and said reference light increase as the maximum brightness levels of said fluorescent image data and said reference image data decrease" (see Final Office Action, page 4, paragraph [05d]).

Further, contrary to the assertion in the Final Office Action, the light source device 12 in FURUSAWA does not include a "light source that varies intensity of the excitation light and reference light in response to voltage applied to said light source". Nor is this feature inherent in FURUSAWA, particularly where different light sources 22 and 24 are used in FURUSAWA to generate white light (white light source 22) and to generate ultraviolet light (UV light source 24), and even more particularly where alternate mechanisms for varying intensity of excitation light and reference light could be employed (e.g., a diaphragm or a light stop) even if any one light source in FURUSAWA was used to provide both excitation light and reference light.

Additionally, contrary to the assertion in the Final Office Action, FURUSAWA does not disclose that the light guide 20 is "inserted through a forceps channel", and does not use the term "forceps" anywhere therein.

Finally, contrary to the assertion in the Final Office Action, FURUSAWA does not disclose, and particularly at col. 5, line 55, that the light source control unit 27 is a "light controller that

controls the intensity of the excitation light according to the first intensity coefficient and that controls the intensity of the reference light according to the second intensity coefficient, said light controller controlling the intensities of said excitation light and said reference light without a variable diaphragm and without a light stop by changing the voltage applied to said light stop". Rather, the cited portion of FURUSAWA, at col. 5, line 55, merely discloses that the light source control unit 27 adjusts, in accordance with an instruction from, for example, PC14, light amounts of illuminating light and excitation light which are incident into the light guide 20 (i.e., without disclosing the mechanism for controlling the amounts of illuminating light and excitation light).

For example, and with respect to the above-noted features of claim 1, the Final Office Action asserts that FURUSAWA discloses features related to a "second intensity coefficient" separable and distinctive from features related to a "first intensity coefficient". FURUSAWA does not disclose any features of a "first intensity coefficient" separate and distinct from a "second intensity coefficient" as recited in claim 1. In this regard, a single teaching of FURUSAWA at col. 5, line 55 is cited as disclosing the distinct and separable features related to the "first intensity coefficient" and the "second intensity coefficient". The Final Office Action is incorrect, and FURUSAWA does not anywhere disclose or suggest features related to a "second intensity coefficient" separable and distinctive from features related to a "first intensity coefficient", or the related features of claim 1 as set forth above.

As described above, FURUSAWA would require extensive modification in order to obtain the features recited in independent claim 1. Accordingly, for the rejection of claim 1 to be proper under 35 U.S.C. §103(a), factual evidence of the presence in the prior art of each of the above-noted features recited in claim 1 <u>and</u> proper motivation to modify FURUSAWA to include

each of the above-noted features recited in claim 1 would be necessary. However, there is no such proper motivation to modify FURUSAWA to include all of the above-noted features which are not disclosed therein. Further, even if all of the modifications proposed in the rejection of claim 1 were proper, such modifications would not result in the combination recited in claim 1, as the rejection is based on numerous incorrect interpretations of the disclosure of FURUSAWA.

There is no proper motivation to modify FURUSAWA in the extensive manner necessary to obtain the features recited in claim 1. In this regard, for the modification of FURUSAWA with the teachings of OZAWA to be obvious under 35 U.S.C. §103(a), and for the modification of the combined teachings of FURUSAWA and OZAWA with the teachings of HIGUCHI to be obvious under 35 U.S.C. §103(a), there must be a teaching, motivation or suggestion of a motivation to combine FURUSAWA and OZAWA, and then a teaching, motivation or suggestion of a motivation to combine the combined teachings of FURUSAWA and OZAWA with the teachings of HIGUCHI. Further, some concrete evidence in the record in support of such findings must be identified. The mere fact that the prior art may be modified in the manner suggested in the rejection does not make the modification obvious unless the prior art, taken as a whole, would have suggested the desirability of the modification to one of ordinary skill in the art.

The cited motivation to modify FURUSAWA with the teachings of OZAWA is based on the description of the Background of the Invention in OZAWA at col. 1, and relates to adjusting the size of an aperture in order to maintain uniform average or peak brightness of an observed image. This is not a proper motivation to modify the teachings of FURUSAWA to obtain the numerous features of claim 1 which are not disclosed in FURUSAWA. That is, there is no proper motivation to modify FURUSAWA with the numerous features noted above which are not disclosed in FURUSAWA,

including:

- a "calculating section that calculates a first intensity coefficient based on the maximum brightness level of the fluorescent image data according to a first operational expression";
- a "calculating section… that calculates a second intensity coefficient corresponding to the maximum brightness level of the reference image data according to a second operational expression";
- an "intensity measuring section that extracts the maximum brightness level from the brightness levels of all the pixels in the fluorescent image data and extracts the maximum brightness level from the brightness levels of all the pixels in the reference image data whenever the image signal acquiring section acquires a set of the reference image data and the fluorescent image data";
- determining "first and second operational expressions... such that the intensities of said excitation light and said reference light increase as the maximum brightness levels of said fluorescent image data and said reference image data decrease";
- a "light source that varies intensity of the excitation light and reference light in response to voltage applied to said light source";
- inserting the light guide 20 "through a forceps channel"; or
- that the light source control unit 27 is a "light controller that controls the intensity of the excitation light according to the first intensity coefficient and that controls the intensity of the reference light according to the second intensity coefficient, said light controller controlling the intensities of said excitation light and said reference light without a variable diaphragm and without a light stop by changing the voltage applied to said light stop".

For example, the mere teaching of detecting peak values using the peak value detecting circuit 63 in OZAWA is not motivation to actually use such detected peak values "whenever" an image data acquiring section acquires a set of the reference image data and the fluorescent image data, particularly insofar as OZAWA explicitly provides an alternative to detecting peak values by detecting an average value using the average value detecting circuit 64.

Further, the cited teachings of OZAWA are disclosed in relation to adjusting the size of an aperture and not in relation to varying a voltage applied to a light source. That is, the Final Office Action is premised on the incorrect assertion that FURUSAWA would inherently vary intensity of excitation light and reference light in response to voltage applied to a light source. However, if this incorrect assertion with respect to FURUSAWA were then taken as true, aperture control as in the Background of the Invention in OZAWA would be redundant and unnecessary.

Additionally, the cited teachings of OZAWA do not disclose the numerous features recited in claim 1 which are not disclosed by FURUSAWA as set forth above. Rather, the Final Office Action essentially relies on OZAWA for the teaching of a peak value detecting circuit 64, and an aperture control circuit 65 that controls the size of an aperture in accordance with a signal output from the peak value detecting circuit. However, modification of FURUSAWA with these teachings at col. 1 of OZAWA would not result in the numerous features of claim 1 which are absent in FURUSAWA as set forth above. Accordingly, even modification of FURUSAWA with the teachings of OZAWA would not result in a modified FURUSAWA including the numerous features of claim 1 which are not disclosed in FURUSAWA as set forth above.

For example, based on the combination of FURUSAWA and OZAWA, a person of ordinary skill in the art could perhaps obtain a controller that controls reference light intensity, and that

controls excitation light intensity in the same manner as the reference light intensity. However, a significant difference may exist in brightness between fluorescent image data and reference image data, such that the combination of FURUSAWA and OZAWA would not result in excitation light intensity being controlled appropriately, as it would be controlled in the same manner as the reference light. Thus, even if a coefficient were used to control reference light intensity, the same coefficient would be used to control excitation light intensity. Therefore, even if it were to be presumed that OZAWA uses a coefficient to control reference light intensity, modification of FURUSAWA with the teachings of OZAWA would not result in the combination recited in claim 1.

Further, there is no proper motivation to modify the combination of FURUSAWA and OZAWA with the teachings of HIGUCHI. In this regard, the cited motivation to modify FURUSAWA and OZAWA with the teachings of HIGUCHI is based on the disclosure of HIGUCHI for adjusting a quantity of outgoing light from a light source immediately before light shielding. However, the mere teaching of varying voltage is not itself motivation to actually vary a voltage applied to a light source in FURUSAWA, particularly where HIGUCHI explicitly provides an alternative to varying a voltage by controlling an aperture of a light quantity restrictor. Moreover, the cited motivation to control a lamp voltage rather than install an aperture in FURUSAWA, i.e., because controlling a lamp voltage "requires fewer mechanical parts", is speculative and not based on a teaching in any document applied in the Office Action.

Additionally, even the modification of the combination of FURUSAWA and OZAWA with the teachings of HIGUCHI would not result in the combination recited in claim 1. Rather, the Final Office Action essentially relies on HIGUCHI for the limited teaching that a light quantity controlling means may variably control the lamp voltage or the aperture of a light quantity restrictor. However,

modification of the combined teachings of FURUSAWA and OZAWA with these teachings at col. 2 of HIGUCHI would not result in the numerous features of claim 1 which are absent in the combination of FURUSAWA and OZAWA as set forth above.

For example, HIGUCHI discloses, at col. 2, lines 54-59, that a "light quantity controlling means may variably control the lamp voltage or the aperture of a light quantity restrictor". However, this voltage control in HIGUCHI is only disclosed to be controlled with respect to a single type of light, and not with respect to both "excitation light" and "reference light". That is, HIGUCHI does not so much as use the term "excitation light" or any similar term in the specification. Moreover, as noted above, HIGUCHI explicitly discloses controlling voltage in combination with a "diaphragm control circuit 39" and a "diaphragm 35" to control light quantity (see col. 7, lines 32-50).

Accordingly, there is no proper motivation to modify FURUSAWA with the teachings of OZAWA, or to then modify the combined teachings of FURUAWA and OZAWA with the teachings of HIGUCHI. Further, as described above, even the modification of FURUSAWA with the teachings of OZAWA, and then the modification of the combined teachings of FURUSAWA and OZAWA with the teachings of HIGUCHI, would not result in the combination of claim 1.

(2) Claims 3-5

Claims 3-5 are also allowable, at least for the reason that these claims depend from an allowable claim 1, respectively, and because these claims recite additional features that further define the invention recited in claim 1. Further, claims 3-5 are separately patentable over FURUSAWA in view of OZAWA and HIGUCHI which, even if combined in any proper combination, still fail to disclose, in Appellant's claimed combination, inter alia,

(i) *the diagnosis supporting device according to claim 1, further comprising: an affected-area-information acquiring section that determines whether a difference between brightness level of a pixel in said reference image data and brightness level of a pixel in said fluorescent image data at the corresponding position is larger than a predetermined threshold value for all of the pixels in said reference image data whenever said image data acquiring section acquires a set of said reference image data and said fluorescent image data, and that acquires position information that specifies the positions of the pixels with differences larger than said threshold value; an image generating section that generates color image data for displaying a monochromatic image on a monitor based on said reference image data acquired by said image data acquiring section; an image composing section that composes said color image data generated by said image generating section and said position information to convert the pixels on said color image data that are represented by said position information into specified pixels exhibiting a predetermined color; and an output section that outputs the composed color image data composed by said image composing section as special observation image data* (claim 3);

(ii) *the diagnosis supporting device according to claim 3, wherein said specified pixels are red* (claim 4); and

(iii) *the diagnosis supporting device according to claim 1, wherein said probe consists of a number of bundled optical fibers* (claim 5).

Accordingly, at least for each and all of the reasons set forth above, the decision to reject claims 1 and 3-5 under 35 U.S.C. §103(a) over FURUSAWA in view of OZAWA, and in further view of HIGUCHI is improper, and reversal of the decision is respectfully requested.

(8) CONCLUSION

Each and every pending claim of the present application meets the requirements for patentability under 35 U.S.C. §103(a), and the present application and each pending claim thereof is allowable over the prior art of record.

If there are any questions about this application, any representative of the U.S. Patent and Trademark Office is invited to contact the undersigned at the telephone number listed below.

Respectfully submitted,
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CLAIMS APPENDIX

1. A diagnosis supporting device connected to an endoscope system that captures an image of a subject facing a tip of an endoscope to generate special observation image data for displaying a special observation image for diagnosis based on image data transmitted from the endoscope system, said diagnosis supporting device comprising:

a light emitting section that alternately emits excitation light to excite living tissue and reference light to illuminate the subject, said light emitting section including a light source that varies intensity of the excitation light and reference light in response to voltage applied to said light source;

a probe that is inserted through a forceps channel to guide the excitation light and the reference light from a proximal end to a distal end;

an image data acquiring section that acquires fluorescent image data generated by the endoscope system when the light emitting section emits the excitation light and acquires reference image data generated by the endoscope system when the light emitting section emits the reference light;

an intensity measuring section that extracts the maximum brightness level from the brightness levels of all the pixels in the fluorescent image data and extracts the maximum brightness level from the brightness levels of all the pixels in the reference image data whenever the image data acquiring section acquires a set of the reference image data and the fluorescent image data;

a calculating section that calculates a first intensity coefficient based on the maximum brightness level of the fluorescent image data according to a first operational expression and that calculates a second intensity coefficient corresponding to the maximum brightness level of the

reference image data according to a second operational expression; and

a light controller that controls the intensity of the excitation light according to the first intensity coefficient and that controls the intensity of the reference light according to the second intensity coefficient, said light controller controlling the intensities of said excitation light and said reference light without a variable diaphragm and without a light stop by changing the voltage applied to said light source,

wherein said first and second operational expressions are determined such that the intensities of said excitation light and said reference light increase as the maximum brightness levels of said fluorescent image data and said reference image data decrease.

3. The diagnosis supporting device according to claim 1, further comprising:

an affected-area-information acquiring section that determines whether a difference between brightness level of a pixel in said reference image data and brightness level of a pixel in said fluorescent image data at the corresponding position is larger than a predetermined threshold value for all of the pixels in said reference image data whenever said image data acquiring section acquires a set of said reference image data and said fluorescent image data, and that acquires position information that specifies the positions of the pixels with differences larger than said threshold value;

an image generating section that generates color image data for displaying a monochromatic image on a monitor based on said reference image data acquired by said image data acquiring section;

an image composing section that composes said color image data generated by said image generating section and said position information to convert the pixels on said color image data that

are represented by said position information into specified pixels exhibiting a predetermined color; and

an output section that outputs the composed color image data composed by said image composing section as special observation image data.

4. The diagnosis supporting device according to claim 3, wherein said specified pixels are red.

5. The diagnosis supporting device according to claim 1, wherein said probe consists of a number of bundled optical fibers.

EVIDENCE APPENDIX

None

RELATED PROCEEDING APPENDIX

None